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Nonlocal interactions of nucleons and anomalous off-shell behavior of two-nucleon amplitudes

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Abstract

The problem of ultraviolet divergences that arise in describing low-energy nucleon dynamics is analyzed. By considering some examples of exactly solvable models, it is shown that, upon renormalization, the interaction that governs nucleon dynamics appears to be nonlocal in time. The effect of this nonlocality on the character of the dynamics of a nucleon system is investigated. It is shown that the time nonlocality of nucleon-nucleon interactions leads to an anomalous off-shell behavior of two-nucleon amplitudes and this anomalous behavior can significantly affect the dynamics of multinucleon systems. © 2002 MAIK "Nauka/Interperiodica".

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